

What is claimed is:

1. A noise removal circuit comprising:
 - a 180-degree odd multiple shifting section for
 - 5 outputting a 180-degree shifted signal that is
 - phase-shifted from an input signal by an odd multiple
 - of 180 degrees; and
 - a difference output section for outputting a
 - difference between the input signal and the 180-degree
 - 10 shifted signal.
2. A noise removal circuit comprising:
 - a 360-degree shifting section for outputting a
 - 360-degree shifted signal that is phase-shifted from
 - 15 an input signal by an integral multiple of 360 degrees;
 - and
 - a sum output section for outputting a sum of the
 - input signal and the 360-degree shifted signal.
- 20 3. A noise removal circuit comprising:
 - a 180-degree odd multiple shifting section for
 - outputting a 180-degree shifted signal that is
 - phase-shifted from an input signal by an odd multiple
 - of 180 degrees;
 - 25 a 360-degree shifting section for outputting a
 - 360-degree shifted signal that is phase-shifted from
 - the input signal by an integral multiple of 360 degrees;

and

a calculation output section for outputting calculation results of a difference between the input signal and the 180-degree shifted signal and of a sum
5 of the input signal and the 360-degree shifted signal.

4. The noise removal circuit according to claim 1,
further comprising a synchronizing signal output
section for outputting a synchronizing signal for
10 synchronizing the input signal and the 180-degree
shifted signal, wherein the difference output section
output the difference in response to the synchronizing
signal.

15 5. The noise removal circuit according to claim 3,
further comprising a synchronizing signal output
section for outputting a synchronizing signal for
synchronizing the input signal and the 180-degree
shifted signal, wherein the difference output section
20 output the difference in response to the synchronizing
signal.

6. The noise removal circuit according to claim 2,
further comprising a synchronizing signal output
25 section for outputting a synchronizing signal for
synchronizing the input signal and the 360-degree
shifted signal, wherein the sum output section output

the sum in response to the synchronizing signal.

7. The noise removal circuit according to claim 3,
further comprising a synchronizing signal output
5 section for outputting a synchronizing signal for
synchronizing the input signal and the 360-degree
shifted signal, wherein the sum output section output
the sum in response to the synchronizing signal.

10 8. The noise removal circuit according to any one of
claims 4 to 7, wherein the synchronizing signal output
section is constituted by a phase-locked loop circuit
and generate the synchronizing signal based on the input
signal.

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9. The noise removal circuit according to any one of
claims 4 to 7, wherein the synchronizing signal output
section is constituted by a delay-locked loop circuit
and generate the synchronizing signal based on the input
20 signal.

10. The noise removal circuit according to any one of
claims 1 to 7, wherein the input signal is a wobble
signal for rotation control that is detected from a
25 recording track of an optical disk.

11. The noise removal circuit according to claim 8,

wherein the input signal is a wobble signal for rotation control that is detected from a recording track of an optical disk.

5 12. The noise removal circuit according to claim 9, wherein the input signal is a wobble signal for rotation control that is detected from a recording track of an optical disk.

10 13. A noise removal method comprising:
outputting a 180-degree shifted signal that is phase-shifted from an input signal by an odd multiple of 180 degrees; and
outputting a difference between the input signal
15 and the 180-degree shifted signal.

14. A noise removal method comprising:
outputting a 360-degree shifted signal that is phase-shifted from an input signal by an integral
20 multiple of 360 degrees; and
outputting a sum of the input signal and the 360-degree shifted signal.

15. A noise removal method comprising:
25 outputting a 180-degree shifted signal that is phase-shifted from an input signal by an odd multiple of 180 degrees;

outputting a 360-degree shifted signal that is phase-shifted from the input signal by an integral multiple of 360 degrees; and

outputting calculation results of a difference
5 between the input signal and the 180-degree shifted signal and a sum of the input signal and the 360-degree shifted signal.

16. The noise removal method according to any one of
10 claims 13 to 15, wherein the input signal is a wobble signal for rotation control that is detected from a recording track of an optical disk.